

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application    WIGREN, Jan *et al.*  
of:

Group Art Unit: 1775

Serial No.: 10/605,372

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Examiner: Blackwell Rudasil,  
Gwendolyn A.

For: THERMAL BARRIER COATING AND A  
METHOD OF APPLYING SUCH A  
COATING

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**RESPONSE TO ADVISORY ACTION**

**INTRODUCTORY COMMENTS:**

In response to the Advisory Action mailed February 22, 2007, please amend the above-identified U.S. patent application as follows:

**Listing of the claims** begins on page 2 of this paper. This listing of claims replaces all prior versions and prior listings of claims in the application.

**Remarks** begin on page 5 of this paper.

**CLAIMS LISTING:**

1. (Previously Presented) A ceramic thermal barrier coating, TBC, deposited and attached directly to a metallic substrate (2) or an intermediate bond coating (3) deposited on such a substrate (2), said TBC comprising:

at least two layers (4, 5) wherein a first, inner TBC layer (4) is directly attached to one of a substrate (2) and a bond coating (3) and presents a dense structure with lower porosity than a second, outer TBC layer (5), said second outer layer containing pores which are flattened out and directed substantially in parallel with the substrate, the pores being obtainable by depositing powder particles comprising an agglomerate of powder grains surrounded by a shell of melted powder material.

2. (Canceled)

3. (Previously Presented) The ceramic thermal barrier coating as recited in claim 1, wherein the second layer (5) has a lower thermal conductivity than the first layer (4), the lower thermal conductivity deriving from the difference in porosity.

4. (Previously Presented) The ceramic thermal barrier coating as recited in claim 1, wherein the first layer (4) has higher strength than the second layer (5), the higher strength deriving from the difference in porosity.

5. (Original) The ceramic thermal barrier coating as recited in claim 1, wherein the second TBC layer (5) defines an outer layer directly exposed to the environment.

6. (Original) The ceramic thermal barrier coating as recited in claim 1, wherein the first and second layers (4,5) have the same chemical composition.

7. (Previously Presented) The ceramic thermal barrier coating as recited in claim 1, further comprising stabilized zirconia.

8. (Previously Presented) The ceramic thermal barrier coating as recited in claim 1, wherein the ceramic thermal barrier coating has been applied by means of thermal spraying process.
9. (Original) The ceramic thermal barrier coating as recited in claim 8, wherein the thermal spraying process comprises plasma spraying.
10. (Original) The ceramic thermal barrier coating as recited in claim 1, further comprising a bond coating (3) sandwiched between the substrate (2) and the ceramic thermal barrier coating (1).
11. (Canceled)
12. (Previously Presented) A method of applying a ceramic thermal barrier coating (1), TBC, on a substrate (2), the TBC being applied on the substrate (2) or an intermediate bond coating (3) between the substrate (2) and the TBC, comprising:
  - applying at least two layers (4, 5) comprising a first TBC layer and a second TBC layer of ceramic TBC upon one of a substrate (2) and bond coating (3);
    - wherein the powder particles used for applying a first TBC layer (4) adjacent to one of the substrate (2) and the bond coating (3) present a denser structure with lower porosity than the powder particles used for a subsequently applied second TBC layer (5); and
    - applying the second TBC layer by depositing powder particles comprising an agglomerate of powder grains surrounded by a shell of melted powder material.
13. (Canceled)
14. (Original) The method as recited in claim 12, wherein the powder particles that constitute the first TBC layer (4) present a dense sintered structure.
15. (Previously Presented) The method as recited in claim 14, further comprising sintering agglomerates of powder grains to the powder particles.
16. (Canceled)

17. (Original) The method as recited in claim 12, wherein each powder particle comprises an agglomerate of powder grains surrounded by a shell of melted powder material.
18. (Previously Presented) The method as recited in claim 17, further comprising HOSP-treatment of the agglomerates of powder grains in order to form powder particles.
19. (Original) The method as recited in claim 12, wherein the first and second ceramic TBC layers (4,5) have the same chemical composition.
20. (Original) The method as recited in claim 12, wherein the TBC further comprises stabilized zirconia.
21. (Original) The method as recited in claim 12, wherein the stabilized zirconia is dysprosia-stabilized zirconia.
22. (Original) The method as recited in claim 12, wherein a diameter of the powder particles is 10-150 micrometers.
23. (Previously Presented) The method as recited in claim 12, wherein a diameter of powder grains forming the powder particles is 0.5-5.0 micrometers.
24. (Original) The method as recited in claim 23, wherein the diameter of the powder grains forming the powder particles is 1.0-2.0 micrometers.
25. (Original) The method as recited in claim 12, wherein the TBC is applied by means of thermal spraying of a ceramic powder on one of the substrate (2) and bond coating (3).
26. (Original) The method as recited in claim 12, wherein the TBC is applied utilizing plasma spraying.
27. (Canceled)

**REMARKS:**

Claims 1, 3-10, and 12-27 are previously pending; claim 27 is hereby cancelled. As such, according to the Advisory Action, this application is in condition for allowance, which is respectfully solicited.

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The undersigned representative requests any extension of time that may be deemed necessary to further the prosecution of this application.

The undersigned representative authorizes the Commissioner to charge any additional fees under 37 C.F.R. 1.16 or 1.17 that may be required, or credit any overpayment, to Deposit Account No. 14-1437, referencing Attorney Docket No.: 7589.0056.NPUS01.

In order to facilitate the resolution of any issues or questions presented by this paper, the Examiner may directly contact the undersigned by phone to further the discussion.

Respectfully submitted,



Tracy W. Druce, Esq.  
Reg. No. 35,493  
Novak, Druce & Quigg, LLP  
1000 Louisiana, Suite 5300  
Houston, Texas 77002  
(713) 571-3400  
(713) 456-2836 (fax)  
[tracy.druce@novakdruce.com](mailto:tracy.druce@novakdruce.com)